First records of *Enarmonia formosana* (Scopoli) in North America (Lepidoptera: Tortricidae)

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ABSTRACT

Enarmonia formosana (Scopoli), a widespread Palaearctic species, was recently found infesting cherry trees in the Richmond area of British Columbia, Canada. Descriptions, illustrations of male and female genitalia, and a photograph of an adult, are provided to help identify the species in North America.

INTRODUCTION

In May 1989, at the request of a homeowner in Richmond, B.C., Agriculture Canada inspectors were asked to look at some cherry trees exhibiting symptoms of yellowing foliage and bark damage that included cankers, gumosis and frass. Larval and adult specimens were collected from the site and submitted for identification. Other specimens were submitted from cherry trees exhibiting similar symptoms in Surrey and Vancouver. In the early spring of 1990, a series of adults emerged in the laboratory from infested cherry logs that were collected at Surrey in 1989. *Enarmonia formosana* (Scopoli), the cherry bark tortrix, was positively identified based on detailed examinations of these specimens. *E. formosana* specimens from France were also examined to further support this identification. It is believed that *E. formosana* has been in the Richmond area for some time, judging from the size of lesions on the host trees caused by repeated infestations of larvae, and from the large number of adults caught in pheromone traps set in these areas during the summer of 1990. The description, illustrations, photograph, and review of biological aspects of this species, provided in the present article, will help researchers to recognize and identify the pest. This information will be particularly useful in survey, monitoring and control programs for this species in Vancouver and neighbouring areas. Various morphological aspects of the species, including illustrations and/or photographs, can also be found in Benander (1950), Bradley *et al.* (1979), Graaf Bentinck and Diakonoff (1968), Hannemann (1961), Kennel (1921), Kuznetsov (1978), and Pierce and Metcalfe (1922). All specimens studied are deposited in the Canadian National Collection in Ottawa.

DIAGNOSTIC FEATURES

Description.

E. formosana can be recognized by the intricately well-defined colours and patterns of the forewing and its distinctive genitalia (Figs. 1–4). Specimens collected in Richmond are darkly pigmented, almost black, with silver and golden-brown markings. There is little variation or sexual dimorphism in this species.

Head. Head black with blue tinge dorsally, creamy-yellow posteriorly; frons black; antenna black dorsally, creamy-yellow ventrally; labial palpus mostly dark blue except for basal segments, median transverse band on segment 3 and ventral and mesal sides of palpus paler, creamy-yellow.

Thorax (Fig. 1). Notum black with narrow golden-brown cross band; tegula black, golden brown basally and distally; pleural area bluish gray. Fore wing: length 7–8 mm; ground colour black; basal third black, distinctly mottled with small irregular silvery-white to yellow patches forming irregular concentric arching bands; median cross band

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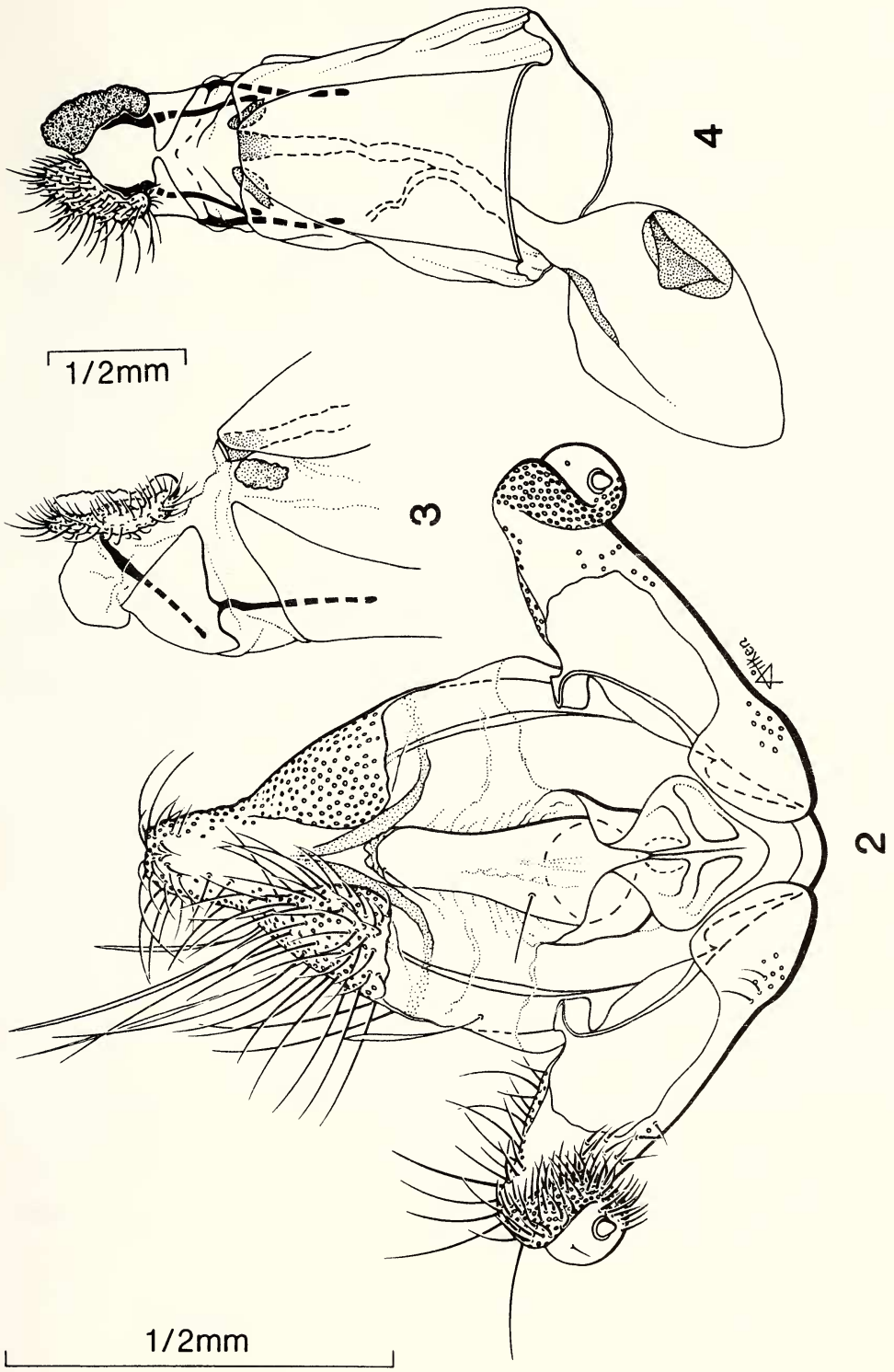
arched toward wing apex, extending from basal third of costa to center of wing and to middle of posterior wing margin, mostly silvery, with narrow creamy-yellow borders, portion from costa to vein Rs golden-brown, surrounded with black, silvery and creamy-yellow or golden-brown rings respectively; tornal eye spot conspicuous, about 1/2 as wide as termen, outer ring narrow golden-brown, inner ring wider silvery, center large with eight alternating black and golden-brown longitudinal dashes; costal strigulae well defined, extending from basal 3/5 to apex, and consisting of five shiny white oblique comma-shaped streaks separated by black areas; three longitudinal bands successively of golden-brown, silvery and golden-brown located along areas immediately posterad and basad of these streaks. Hind wing black. Legs banded, formed by combination of two contrasting colours: creamy-white on ventral side, both ends of each segment, tibial spurs and median area of front tibia; black on other areas.

Abdomen. Black dorsally, creamy-white ventrally.

Male genitalia (Fig. 2). Uncus well developed, fleshy and stout, bearing numerous slender setae; socius large, triangular, fused to uncus and tegumen and attached to ventral side of tegumen, bearing numerous long and slender setae. Gnathos weak, lightly sclerotized. Transtilla absent. Tegumen longer than basal width, horseshoe-shaped. Valva slender, gently arched posteriorly, finger-shaped, distal end broadly and deeply grooved forming bifid apex with ventral part bearing dense setae and dorsal part bearing single conical stout seta. Aedeagus cylindrical, broadly enlarged basally; cornutus absent.

Female genitalia (Figs. 3A–B). Bursa copulatrix oval, densely reticulate; signum well developed and sclerotized, nearly circular with large, internal, triangular, blade-like ridge; area anterad and ventrad of ductus bursa lightly sclerotized. Antrum small, lightly sclerotized. Pleural areas immediately laterad of antrum with pair of small rectangular sclerites. Abdominal tergite 9 spiculate.



Figs. 1–4, morphological aspects of *E. formosana: 1.* dorsal aspect of adult ♂; *2.* ventral aspect of male genitalia with partially spread valvae; *3.* lateral aspect of distal portion of female genitalia; *4.* ventral aspect of female genitalia.

REMARKS

The fore wing markings, particularly the tornal eye spot and the well-defined costal strigulae of *Enarmonia formosana,* resemble those of a number of nearctic *Cydia* species. The fore wings of specimens of *Eucosmomorpha albersana* (Hübner), an introduced palaearctic species belonging to the Enarmonini, collected in Michigan, U.S.A. (Miller 1983) and Saskatchewan, Canada (CNC) also show markings similar to *E. formosana*. However, *E. formosana* can be easily distinguished from the above-mentioned species on the basis of its rather unique structures of the male and female genitalia.

DISTRIBUTION AND BIOLOGY

The cherry bark tortrix occurs throughout Europe, temperate Asia and North Africa. The larvae feed on the bark and sapwood of a variety of plants of the family Rosaceae including *Cydonia* (quince), *Malus* (apple), *Prunus* (almond, apricot, cherry, nectarine, peach and plum), *Pyracantha* (firethorne), *Pyrus* (pear) and *Sorbus* (mountain ash). The larvae feed within bark tissue and may extend damage into the cambium. Attacks are more obvious on older or previously injured trees. Detailed descriptions of the biology and life history are outlined in Balachowsky (1966) and Alford (1984). The Plant Protection Division of Agriculture Canada is in the process of surveying the Lower Mainland of British Columbia to determine the current distribution of cherry bark tortrix.

ACKNOWLEDGEMENTS

We thank Shane Sela, Owen Croy, Ed Ross and Chris Yeoh, Agriculture Inspection Directorate, Agriculture Canada for collection of specimens and providing information from British Columbia; J. Chambon, INRA, France, for providing specimens of *Enarmonia formosana* from Europe for comparison; Stephen Aitken for illustrating the male and female genitalia and Bill Lukey for taking the photograph of the adult.

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